

corroded, their original diameter being reduced here and there to $\frac{1}{8}$ inch.

February 25th was a rainy day during the forenoon, with heavy wind from the south-east, but in the afternoon the sky cleared. There had been no sign of thunder all day. At 5 P.M. my wife, my son, and myself were standing under the flagstaff and within 10 feet of a mooring chain, watching the bay, when the vane was suddenly struck by lightning, which broke the mast short off in two places, tearing and splitting the wood between the vane and the iron guy ropes. Through these the discharge then passed to the ground, but three out of the four mooring chains were broken. Not only one, but many links in each of these chains were snapped, both above and below ground, and several of the links were broken in two places at once. The fractures were crystalline and showed no signs of heat. On the garden path, and within a yard of myself, stood an iron roller, towards which the discharge ploughed two shallow furrows in the gravel; one of these is 8 feet long and terminates in a splash of gravel upon the roller.

The broken mast and vane fell to the ground close to us. The former was blackened from end to end around half its circumference, and the edges of the discoloration form ragged splashes. The brass tube forming the vane was ripped open, and all solder about the vane melted. Below the point where the wire ropes were attached to it the mast was uninjured. Shivered fragments of the staff were found on the ground as far as 150 feet to windward. Heavy hail followed the flash, the wind falling instantly to a dead calm; a second but distant flash was seen twenty minutes later, after which there was no more lightning. The discharge startled the whole village of Paignton; the coast guard officer compares the explosion to that of a 300-pounder gun; and at Torquay, $\frac{3}{4}$ miles distant, a scientific friend speaks of both flash and crash as most terrific.

I must now attempt to describe the effects on ourselves and the impressions on our senses, though I am conscious of difficulty in avoiding subjective matter here. Of the three, my wife only was "struck," and fell to the ground, my son and myself remaining erect, and all three retaining consciousness. For more than half an hour my wife lost the use of her lower limbs and left hand, both of which became rigid. From the feet to the knees she was splashed with rose-coloured tree-like marks, branching upwards, while a large tree-like mark, with six principal branches diverging from a common centre, thirteen inches in its largest diameter, and bright rose red, covered the body. None of us are certain of having seen the flash, and my wife is sure she saw nothing. As to the noise, my wife heard a "bellowing" sound and a "squish," recalling fireworks; my son also heard a "bellow," while I seemed conscious of a sharp explosion. My wife describes her feeling as that of "dying away gently into darkness," and being roused by a tremendous blow on the body, where the chief mark was afterwards found. My son and myself were conscious of a sudden and terrific general disturbance, and he affirms that he received a severe and distinctly electrical shock in both legs. My left arm, shoulder, and throat especially suffered violent disturbance, but I did not think it was electrical. As I turned to help my wife, who was on the ground, I shouted, as I thought, that I was unhurt, and hoped they were also, but it seems I only uttered inarticulate sounds, and my son, in his first attempt to answer, did the same. This, however, was only momentary; in an instant we both spoke plainly.

Neither of us referred the occurrence immediately to its true cause, but the idea of being fired at was present to all our minds, my wife indeed remained of opinion that she was shot through the body, until she heard me speak of lightning. An infinitesimal lapse of time enabled my son and myself to recognise lightning; but I cannot say whether I did so before or after my first glimpse of the wreck on the ground. Neither of us heard or saw the mast fall, though it descended fifty feet, and fell on hard gravel close to us. My son and myself both experienced a momentary feeling of intense anger against some "person or persons unknown," further showing that we primarily referred the shock to some conscious agency. I ought perhaps to add, that neither of us felt any sensation of fear at the time; but we were all very nervous for several days after.

I have endeavoured to keep to fact throughout, but I venture to add a remark made by my wife as we raised her from the ground: "I feel quite sure that death from lightning must be absolutely painless;" and I offer it as an unconscious corroboration of views on this subject which our experience seems to strengthen.

Though no electrician, I conclude from the splash of gravel on the garden roller that the discharge was from cloud to earth, and the oxidised mooring-chains being inadequate to carry it all to ground, my wife formed a conductor for one of many sprays flying in all directions from the broken links.

Paignton, March 10

D. PIDGEON

Mr. G. Darwin's Paper on Cousin Marriages

THE report in the *Times* of my paper on Cousin Marriages, read before the Statistical Society on Tuesday, the 16th inst., contains an important error. It is there made to appear that out of 8,170 lunatics and idiots in England and Wales, 4,308 were offspring of first cousins. This should have run:—Answers with respect to the parentage of 4,308 out of the 8,170 patients were obtained; 142 to 149 of these were stated to be offspring of first cousins, that is to say, nearly $3\frac{1}{2}$ per cent. Similarly, out of 514 patients in Scotland, 51 per cent. were found to be offspring of first cousins.

I had hoped that the monstrous nature of the mistake would have shown it to be a misreport; but although the error was pointed out in the next day's *Times*, I have already had my attention drawn to it several times, and you would therefore be conferring a great favour on me by giving further publicity to the correction in your columns.

GEORGE DARWIN

Down, March 21

Mounting Acari for the Microscope

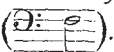
I HAVE much pleasure in detailing, for the benefit of your correspondent Mr. R. C. Fisher, a method I practised extensively some years since, and with the best possible results, in preparing Acari for the cabinet. The section then occupying my attention was the group of the *Hydrachnidae*, or "Water Mites," and to illustrate which I possess some hundred slides representing twenty or thirty species in various conditions of development. In first attempting to preserve these as permanent objects for the microscope I encountered difficulties similar to those of Mr. Fisher; the little animals being hard to kill, and their limbs in death doubling beneath to the great detriment of their personal appearance. As an experiment, I tried immersing them in boiling water, and was rewarded by finding this treatment to achieve everything that could be desired, death being instantaneous, and with the limbs rigidly extended in perfect symmetry. This method proved equally efficacious with various earth mites, such as *Trombidium*. A watch-glass, spirit lamp, and camel's hair brush is all the apparatus necessary. The occupation of other and larger "fish to fry" has unfortunately prevented my prosecuting the study of this most interesting group of the Arachnida so far as I first proposed.

Manchester Aquarium

W. SAVILLE-KENT

The "Wolf" in the Violoncello

CAN any of your readers explain the reason of the unpleasant jarring noise which is sometimes found in certain notes of the violoncello, termed by musicians the *wolf*?

In an instrument in my possession the *wolf* exists on one note only, viz., the F of the bass clef (). This is not due

to a defect in the string, as the same note stopped on the G string still produces the *wolf*.

It seems, therefore, that from some defect in the instrument itself, it is unable to vibrate in conjunction with a string having a certain rate of vibration, though it will take up the vibrations of every other but this particular note.

HERBERT F. FRYER

Coloured Shadows

SIX Grove's cells were connected with one of Ladd's large induction coils, and the secondary current, condensed by two large Leyden jars, was sent, in the usual way, between two pairs of metallic electrodes, in order to examine their spark spectra.

Two of the electrodes were of platinum: these may be called pair A.

Of the other pair, B, one electrode was of platinum, and the other of the metal to be examined.

Place a piece of white paper equidistant from, and on one side of, the two sparks. Hold the finger so that a shadow of it may

be cast by each spark. The two shadows will be seen to be most beautifully tinted with different delicate colours, varying according to the metal inserted in B.

It will be seen that the shadow thrown by A is lighted by B, and is seen on a ground jointly illuminated by A and B; whilst B's shadow, lighted by A, is seen on the same common coloured ground as before.

Without these considerations, it might have been supposed that the shadow thrown by B, and lighted by the unchanging spark A, would itself have remained unaltered. I saw it of the colours, pink, light pink, dim pink, light green, nearly white, and yellow-green; corresponding to the introduction into B of Bi, Ag, Sn, In, Al, and Mg respectively.

I was indebted for the apparatus to Prof. Liveing, in whose laboratory last November, at Cambridge, I made these observations.

C. T. L. WHITMELL

Nottingham, March 16

OUR ASTRONOMICAL COLUMN

ANTHELM'S STAR OF 1670 (II VULPECULÆ).—In the catalogue of stars observed at the Royal Observatory, Greenwich, in the year 1872, in the volume lately circulated, will be found the position of the small star near the place of Anthelm's star of 1670, which was for some time of the third magnitude. It is No. 816 in the above-named catalogue, and for 1875.0 its R.A. is 19h. 42m. 32s. 78., and N.P.D. 62° 59' 15".4. This is only about one minute of arc from the place given by Picard's observations published in Lemonnier's "Histoire Céleste," and there is an uncertainty in the R.A. deduced from those observations amounting to one or two seconds of time. The star deserves attention, and the more so as there has been a suspicion of sensible variation about an average minimum for some years past. It may be advantageously compared with a star of pretty nearly the same magnitude following 12s.5 in R.A., and 4'9 to the north, and also with one which follows 22s.5, about 0'7 to the north. Occasional slight variations are perceptible in Nova (Ophiuchi), 1848, usually of 12'13 magnitude, and, according to Schönfeld's observations in Nova (Coronæ), 1866, also, as we have lately stated, in the star close upon the position of Nova (Cassiopeæ), 1572. We follow the example of the Mannheim astronomer in applying the term Nova to these objects, though it would probably be more correct in each case to consider them as belonging to a class of irregular variables of great extremes of brightness. Mr. Tebbutt, of Windsor, N.S.W., was satisfied from his own observations that η Argus had been "alternately above and below a mean magnitude" for several years previous to 1870.

METEOR-SHOWER OF OCTOBER A.D. 855.—This shower of meteors does not fall in with the thirty-three year period indicated by Prof. H. A. Newton; but from the description in "Annales Fuldenses," it was evidently one of similar character, and indicated a great accumulation of meteors in a part of their orbit far distant from the mass encountered by the earth in 1799, 1833, and 1866. We read: "Mense vero Octobris xvj. Kal. Novemb. (i.e. October 17, O. S.), per totam noctem igniculi, instar spiculorum, occidentem versus per aerem densissime ferebantur." It was from a comparison of this date with that of the great display in 1366, witnessed in Bohemia and in Portugal, that Boguslawski suspected an advance in the nodes of the meteor-orbit at a time when its real form had not been detected. Quetelet, in his "Nouveau Catalogue des Principales Apparitions des Etoiles Filantes," refers to an Arabic account of the same shower (855), and on the same date, Oct. 17, in the following year, he mentions the occurrence "des feux semblables à des pointes parcourent le ciel pendant toute la nuit," on the authority of a chronicler whose history is found in Bouquet's Collection; suspecting, however, its identity with the shower recorded by the Fulda annalist. We know that there are recent cases of considerable numbers of meteors on or

about November 12, which are also divergent from the thirty-three year period for maximum, as on Nov. 12, 1820 and 1822; but the shower of October 17, 855, appears a remarkable instance. The dense stream towards the west brings to recollection the grand display of November 1866.

COMET 1840, III.—This comet, discovered by Dr. Galle, at Berlin, on March 6, and observed at Pulkova till the 27th of the same month, affords a curious instance where one of these bodies, after apparently encountering the powerful influence of the planet Jupiter, has presented itself in these parts of space moving in an orbit which is undistinguishable from a parabola. Definitive elements have been lately calculated by Kowalczyk and Doberck, and if we trace the path backward thereby, to the beginning of 1839, we find the distance between the comet and planet about January 20 would be less than a third of our mean distance from the sun. It is true the interval over which the observations extend is only three weeks, but the residual errors of the parabola are so very small, that it is evident no very sensible ellipticity was produced by the near approach to Jupiter, as would appear to have been the case with many other comets. There is a suspicion that something similar took place with the third comet of 1759, which passed so near the earth in January 1760, but the elements of that body may perhaps admit of better determination. Lacaille's orbit shows a pretty close approach to Jupiter on the comet's journey towards the sun, a circumstance first referred to by Pingré.

THE BIRDS OF BORNEO*

THE fifth volume of the annals of the "Museo Civico" of Genoa (for the establishment of which science is indebted to the liberality and exertions of the Marchese Giacomo Doria) is devoted to an elaborate memoir on the birds of Borneo, prepared by the well-known ornithologist, Tommaso Salvadori, of the Museum of Turin. The work is based upon the rich collections made by Doria and his companion, Dr. Beccari, during a scientific expedition to Borneo in 1865 and the following years. Whilst the latter naturalist devoted himself principally to plants, and obtained an enormous series of them which has enriched many of the herbaria of Europe, the former occupied himself in general zoological collections. Among the results of his activity were upwards of eight hundred specimens of birds, obtained chiefly near Kutchin, the capital of Sarawak, which was the head-quarters of the travellers. Dr. Salvadori having had this fine collection placed in his hands for examination, thought the opportunity was favourable for attempting a complete account of the birds hitherto known to have been obtained in Borneo, on which, up to the present time, there has been no authority. In the present memoir we have the results of his labours, forming altogether a volume of 430 pages.

Considering the large extent of the island of Borneo, the published works of naturalists upon its fauna are few, and a large portion of its varied surface remains still unexplored. As regards its ornithology, we are indebted to the naturalists formerly employed by the Dutch National Museum at Leyden for the greater part of our knowledge. Schwaner, Diard, Salomon Müller, and others, made rich collections in the territories of Pontianak and Banjer-massing, fifty years ago, and supplied many of the types figured by Temminck in his "Planches Coloriées." Our Mr. Wallace was the first ornithological explorer of Sarawak, but never published any complete account of his collections made there. Another English naturalist, James Mottley, also made several collections in the island of Labuan and in Banjer-massing. These were partly described in 1855, in a work commenced by Mr. Mottley

* "Catalogo sistematico degli uccelli di Borneo," di Tommaso Salvadori con note ed osservazioni di G. Doria ed D. Beccari, intorno alle specie da essi raccolte nel Ragiato di Sarawak.